

Welcome to Hoosier Riverwatch

Hoosier Riverwatch is a state-sponsored water quality monitoring initiative. The program was started in Indiana to increase public awareness of water quality issues and concerns by training volunteers to monitor stream water quality. Hoosier Riverwatch collaborates with agencies and volunteers to:

- Provide education and training on watersheds and the relationship between land use and water quality.
- Increase public involvement in water quality issues.
- Promote responsible stewardship of water resources.
- Provide water quality information to citizens and governmental agencies working to protect Indiana's rivers and streams.

Hoosier Riverwatch will assist you and your organization in understanding the importance of protecting local streams. Voluntary participation is the key to the success of the statewide stream monitoring and education program. This manual provides information to help you begin a successful water quality monitoring program.

The first two chapters cover safety considerations, developing a study design, and background information on water quality and watersheds. Each of the next three chapters explains in detail how to perform habitat, chemical, and biological monitoring. The final two chapters relate to data analysis, action, and reporting. The Appendices provide numerous resources, including information on equipment, books, and websites. The final Appendix section is entitled "Extra Data Sheets" - it includes blank copies of all the data sheets.

How do Volunteers Get Started?

Training Workshops

To start a successful local Hoosier Riverwatch program, you should attend a training workshop and thoroughly read this manual. Training Workshops are held around the state (generally from May-October), are free and open to the public, and provide hands-on monitoring experience. Certified volunteers may submit data to the Riverwatch online database [www.HoosierRiverwatch.com]. Contact us or check our website [www.Riverwatch.in.gov] for an updated training schedule.

Volunteer Stream Monitoring Training - introduces citizens and educators to water quality monitoring utilizing physical, chemical, and biological assessment methods. Riverwatch training workshops are free and are open to any interested adult. The sessions are about 8 hours in length and provide hands-on experience in volunteer stream monitoring methods. After completion of this training, participants become "Certified Volunteer Monitors." Riverwatch volunteers are able to perform stream testing, submit data to the statewide volunteer stream monitoring database, and teach students how to monitor.

Volunteer Instructor Training - requires Riverwatch monitoring experience, submission of an application, and acceptance into the program. Volunteer Water Monitoring Instructors conduct Hoosier Riverwatch training workshops and serve as local contacts for other volunteer monitors.

Equipment Application Program

Hoosier Riverwatch has awarded water monitoring equipment to volunteer groups since 1996. Equipment recipients form the foundation of the Hoosier Riverwatch volunteer stream monitoring network. These volunteers agree to monitor their selected stream or river segments at least four times per year for two years and must attend a Riverwatch training workshop. Any school, nonprofit organization, or governmental agency in Indiana is eligible to apply. Contact Hoosier Riverwatch for this year's guidelines and application procedures. Two different equipment packages are offered:

- ✓ **Chemical Monitoring Equipment**

This package provides simple chemical testing methods suitable for adults with no previous experience, as well as students from the elementary through college level. This package provides tests for dissolved oxygen, BOD, temperature, phosphate, nitrate, nitrite, pH and turbidity.

- ✓ **Biological Monitoring Equipment**

This package includes equipment necessary to sample a shallow (wadeable) stream or river site for benthic macroinvertebrates – aquatic organisms living in the streambed. Supplies provided include sampling nets and identification keys. If your site is too deep for this type of monitoring, you do not need this equipment.

- ✓ **Both the Chemical Testing and Biological Monitoring Equipment Packages**

[Note: Prior to 2004, the methods utilized by the Riverwatch program were different than those now provided by the Equipment Application Program. Supplemental instructions for these previously-used kits (GREEN Standard Water Monitoring Kit and the HACH Stream Survey kit) are provided online at www.Riverwatch.in.gov and may be downloaded as Adobe Acrobat files.]

Citizen/Individual Volunteer Participation

Although **individuals** can not receive equipment through the application program (because equipment packages are only awarded to organizations), you can still participate in the program! Volunteer stream monitoring equipment is available through 20 Riverwatch loaner sites established throughout the state. In addition, many county Soil and Water Conservation Districts (SWCDs) have equipment available to loan to certified Riverwatch monitors. See Appendix A- Monitoring Equipment - for a map of loaner sites, and information on purchasing or making your own sampling equipment.

Organizing Your Group

To get a "Riverwatchers" group started in your area, begin by contacting existing organizations already involved with stream or lake activities. A successful Hoosier Riverwatch group can use the support of a well-organized and like-minded constituency. Some individuals and/or organizations that you may want to contact for support include: citizen and civic groups, local government officials, lake associations, university specialists, community health officials, water utilities, canoe or fishing clubs, and county Soil and Water Conservation Districts. Contact Riverwatch to learn who is monitoring in your community.

Water Quality Monitoring

Trend Monitoring

Trend monitoring is the primary testing method preferred by Hoosier Riverwatch. To get an accurate picture of a stream's water quality, tests have to be performed on a regular basis (consistently), over a period of years (persistently). Without long-term continued monitoring, data obtained by Riverwatch volunteers may have limited uses. A random, one-time sample provides a limited picture of water quality and overall health of a water body at the particular site and time it was monitored.

Many things can affect a one-time sample, and weather can be the largest single outside influence on many water quality parameters. Trend monitoring provides a broad view of the stream allowing the seasonal variations to be sorted out from long-term changes. In order to obtain data useful for trend analysis, volunteers should consider the long-term commitment involved in this type of monitoring.

Water Quality Monitoring Parameters

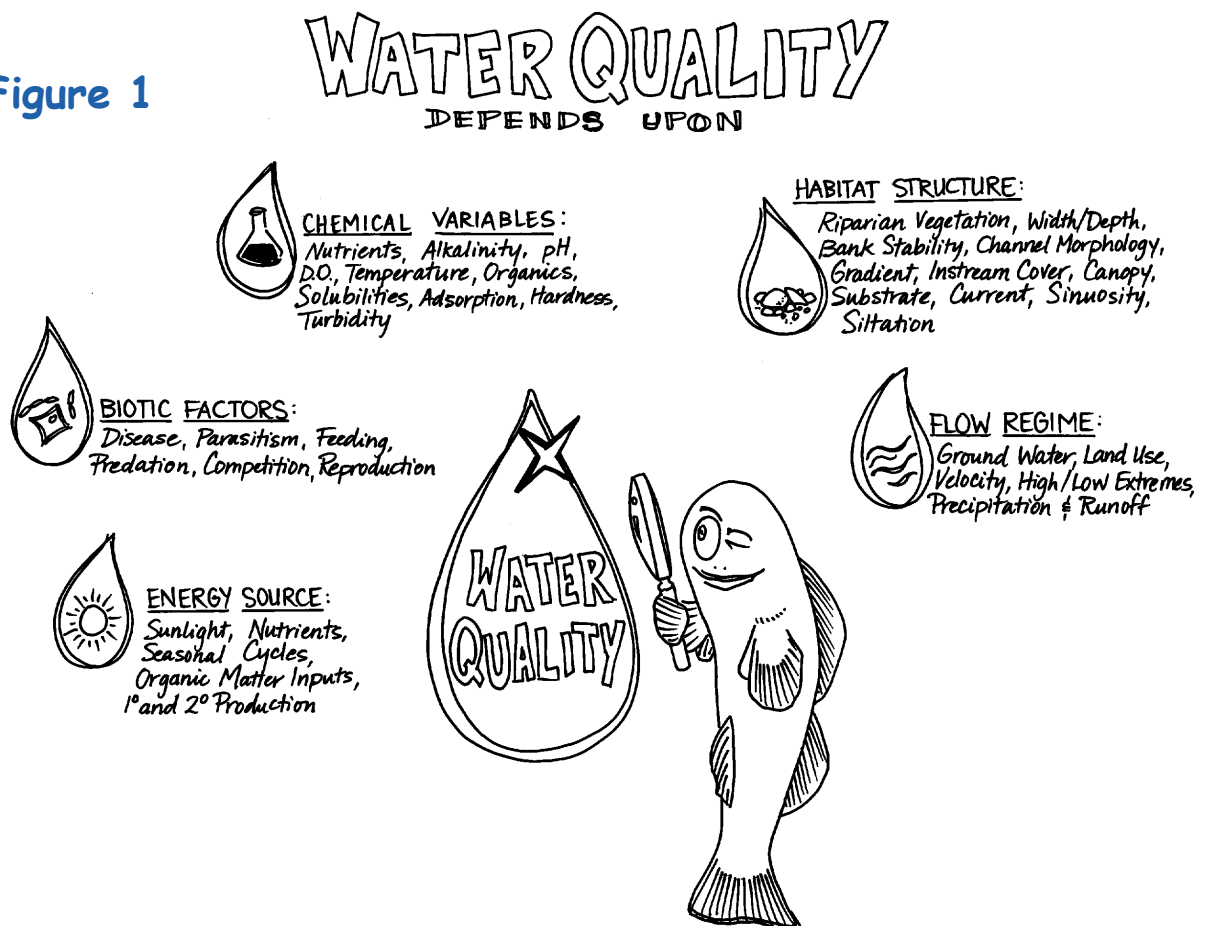
Water quality is determined by a variety of factors (See Figure 1). But due to time and resource constraints, Hoosier Riverwatch volunteers only monitor a fraction of the possible parameters.

Habitat - land use, substrate, flow, depth, riparian vegetation, stream shape, erosion

Chemical - dissolved oxygen, *E. coli*, nitrate, turbidity, phosphate, pH, BOD, temperature change

Biological - benthic macroinvertebrates

Figure 1



Safety Safety is the critical first step in any volunteer stream monitoring program. All volunteers should read the following safety precautions prior to beginning any monitoring activities.



- ✓ **Take a buddy along!** Always monitor with at least one partner. Always let someone else know where you are, when you intend to return, and what to do if you do not return on time.
- ✓ **Honor private property rights.** Never cross a landowner's property without permission. The right of public access to Indiana streams is determined by whether the waterway is classified as "navigable." While all flowing surface water in Indiana is owned by its citizens, the public may only enter or access without permission the streambeds and banks (up to the Ordinary High Water Mark) of navigable waterways. The streambeds and banks of non-navigable waterways are privately owned and, therefore, require permission to enter or access. To learn if a particular stream is navigable, non-navigable, or currently unclassified, please refer to www.IN.gov/nrc/policy/navigati.htm.
- ✓ **Never wade in swift or high water.** Do not wade if depth is greater than knee-deep. Do not monitor if the stream is at flood stage. Any stream is dangerous in times of flooding. If you have a potential drowning situation, remember the lifeguarding tenant: **Reach, Throw, Go!** First, try to reach with a pole, net, branch, or yardstick. Then, throw something (life preserver) that floats or that is tied with a rope and will enable you to pull him/her into shore. Only attempt a swimming rescue as a last resort. A drowning person can panic and pull you under, too.
- ✓ **Beware of polluted streams that are known to be unsafe for handling.** Check with your County Health Department or the Indiana Department of Environmental Management for information on bacterial and/or toxic contamination of local waterways. As a rule, treat every stream as if it were polluted - wear waders, rubber gloves, and protective eyewear. **Never drink the water in a stream.** Wash with antibacterial soap if your hands have been in contact with stream water.
- ✓ **Have a first aid kit on hand** (page 5). At least one team member should have first aid/CPR training.
- ✓ **Develop a safety plan.** Take a cell phone with you. Locate the nearest medical center and write down directions for traveling there. Have a medical form for each volunteer monitor including emergency contacts, insurance and pertinent health information such as allergies, diabetes, epilepsy.
- ✓ **Listen to weather reports.** Never monitor if severe weather is predicted or if a storm occurs.
- ✓ **Be very careful when walking in the stream.** Wear shoes that are in good condition and have traction. Rocky-bottom streams can be very slippery and may contain deep pools. Muddy-bottom streams may also prove dangerous where mud, silt, and sand have accumulated in sinkholes. If you must cross the stream, use a walking stick to steady yourself. Watch for barbed wire fences or sharp, rusty objects (e.g., car bodies, appliances) that may pose a particular hazard.
- ✓ **Do not walk on unstable stream banks.** Disturbing these banks—including the vegetation growing upon them—can accelerate erosion and lead to a collapse.
- ✓ **Beware of animals and plants.** Watch for irate dogs, farm animals, wildlife (e.g., snakes), and insects such as ticks, mosquitoes, and hornets. Know what to do if you are bitten or stung. Watch for poison ivy, sumac, and other skin-irritating vegetation.

Chemical Safety

The chemical reagents supplied in the testing kits are laboratory grade reagents. Some of the chemicals are concentrated, some are irritating, some are poisonous and some will just make you itch. Please read thoroughly the directions and the Materials Safety Data Sheets (MSDS) provided with each kit. The reagents provided in the CHEMetrics kits are mild skin and eye irritants.

- ✓ **Wear safety goggles and rubber gloves.** Avoid contact between chemical reagents and your skin, eyes, nose, and mouth. Never use your fingers to stopper a bottle when shaking a solution.
- ✓ **Do not mix chemicals indiscriminately.** Use only the designated chemicals in specified amounts when performing tests.
- ✓ **Provide wash water** at the monitoring site to wash any chemicals from the eyes or the body.
- ✓ **Know chemical clean-up, disposal, and first aid procedures.** Wipe up all spills when they occur. Use sealed plastic containers filled with an absorbent material (e.g., kitty litter) to store waste before disposal. If accidental consumption of chemical reagents occurs, have your MSDS on hand and contact your local poison control office or one of the following:

Phone numbers for EMERGENCY only:

Indiana Poison Control Center	1-800-382-9097
Rocky Mountain Poison Center	1-800-623-5716

- ✓ **A first aid kit may not be enough.** In addition, carry such safety equipment as life buoys, life jackets, river rescue throw bag, a flashlight, a whistle, and **insect repellent**.

First Aid Kit

Your first aid kit should contain the following items (at a minimum):

- ☐ Telephone numbers of emergency personnel
- ☐ Several Band-Aids for minor cuts
- ☐ Antibacterial soap or alcohol wipes
- ☐ First aid cream or ointment
- ☐ Several gauze pads 3-4" square for deep wounds with excessive bleeding
- ☐ Aspirin or other pain reliever/fever reducer
- ☐ A needle and tweezers for removing splinters
- ☐ A first aid manual that outlines diagnosis and treatment procedures
- ☐ A single-edged razor blade for minor surgery and cutting tape to size
- ☐ A 2" roll of gauze and a triangular bandage for large wounds
- ☐ A large compress bandage to hold a dressing in place
- ☐ A 3" wide elastic band for sprains, applying pressure to bleeding wounds
- ☐ If a participant is sensitive to bee stings, include their doctor-prescribed antihistamine
- ☐ An eyewash to flush chemicals

These guidelines were adapted from the Environmental Protection Agency's 1997 *Volunteer Stream Monitoring Manual*.